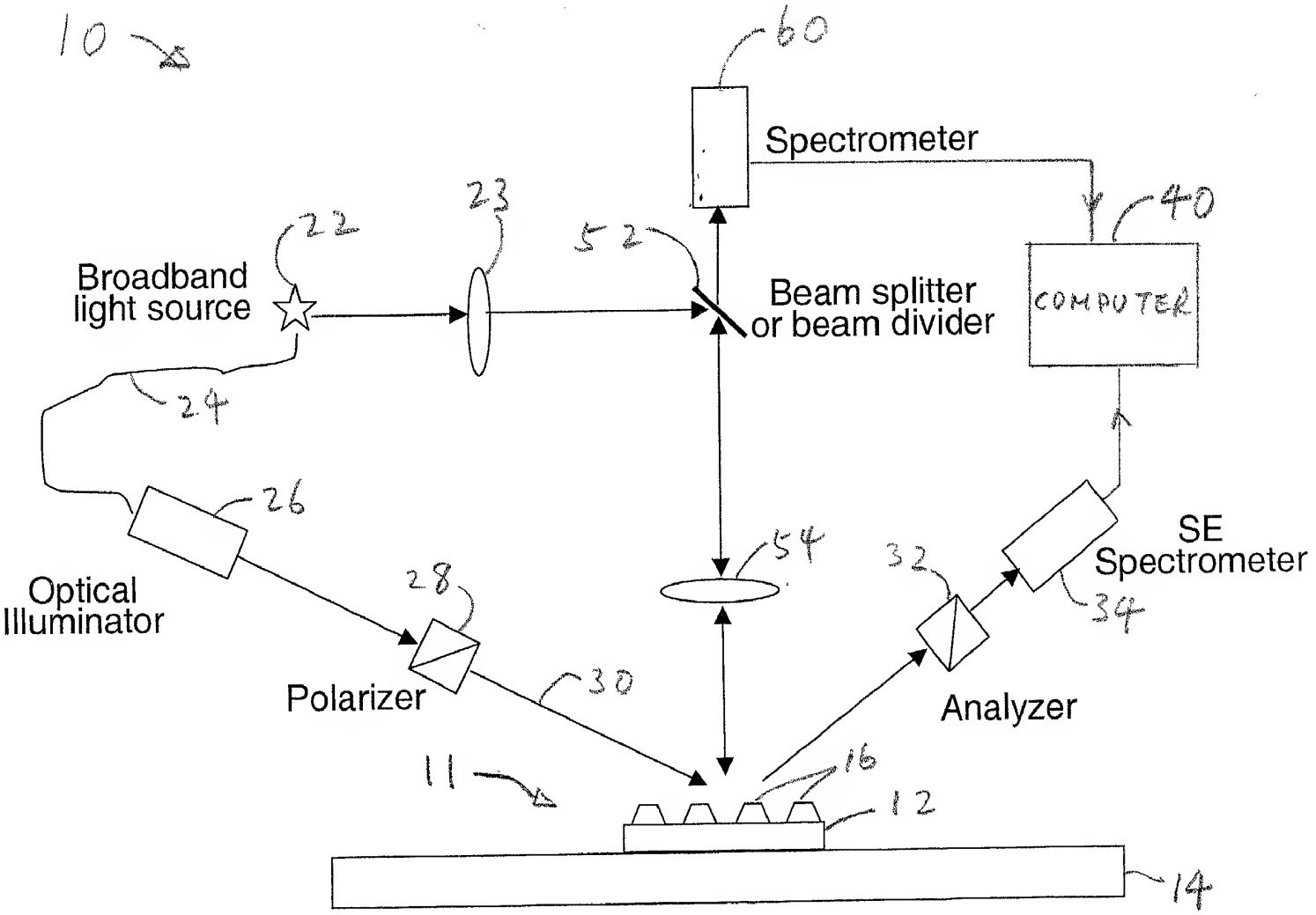

10
60
Spectrometer
40
COMPUTER
23
22
52
Broadband
light source
Beam splitter
or beam divider
24
26
Optical
Illuminator
54
28
32
SE
Spectrometer
34
Polarizer
30
Analyzer
11
16
12
14

FIG 1A

Light diffraction on grating

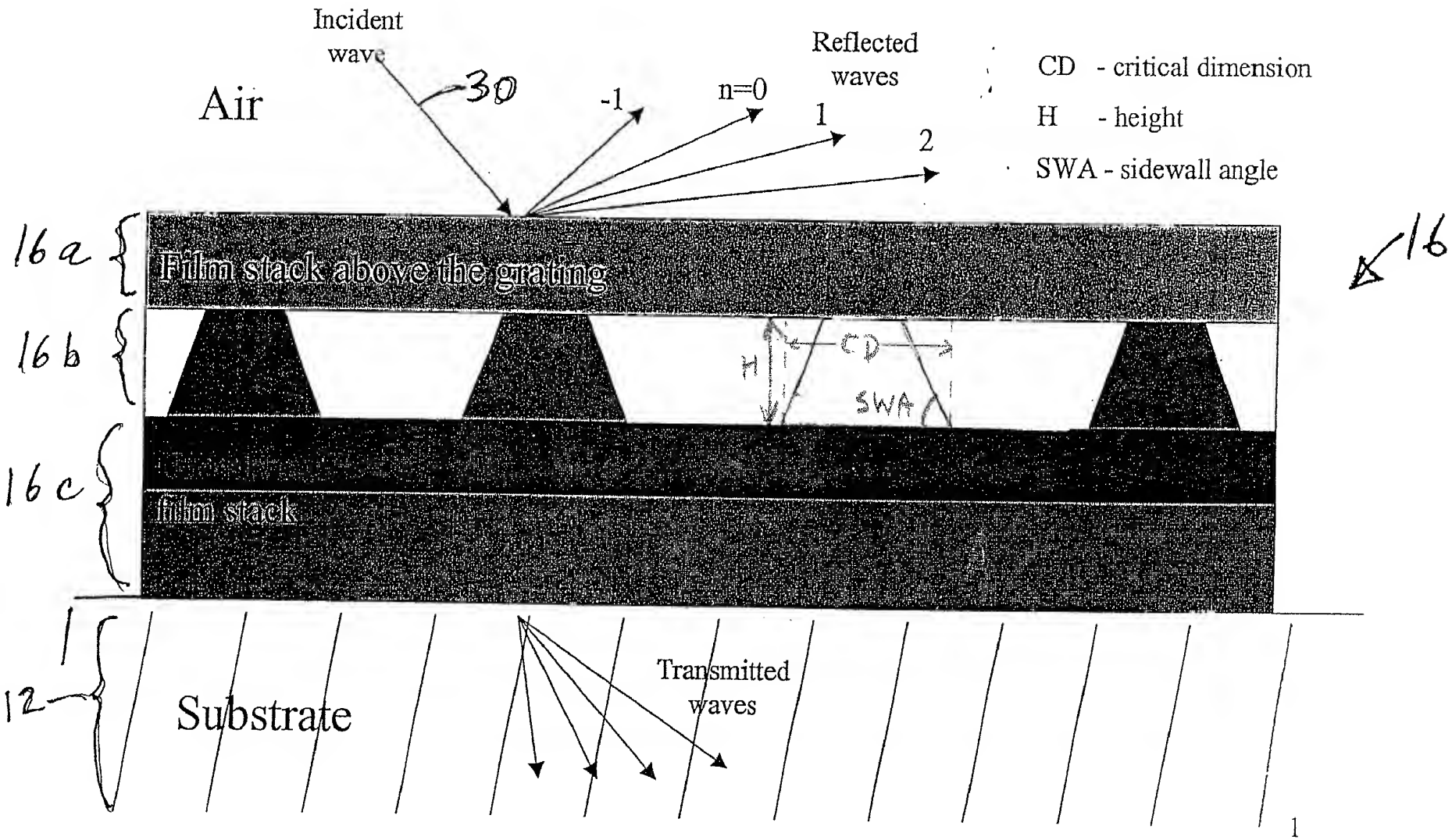


FIG. 1B

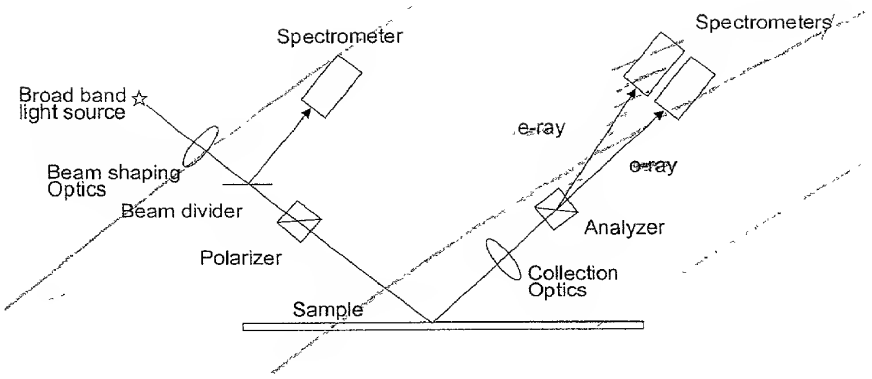


Figure 1

80

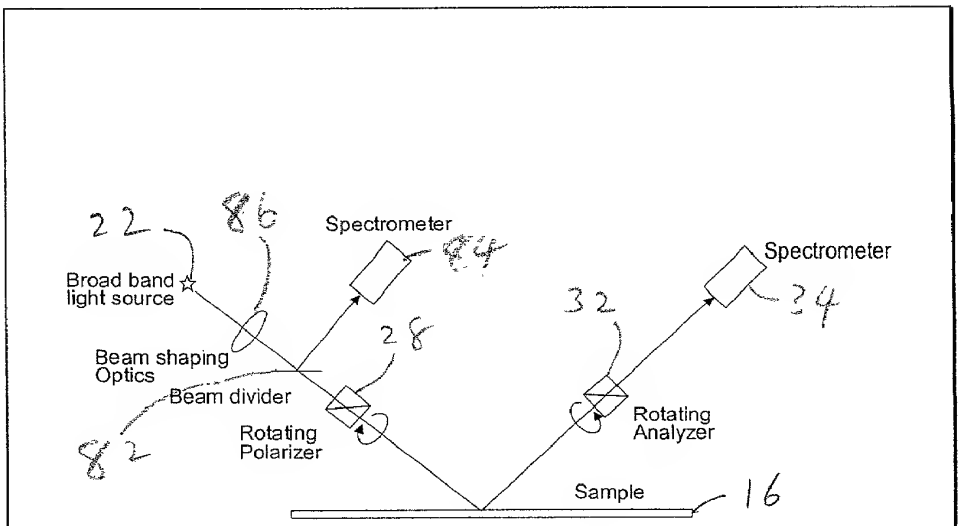
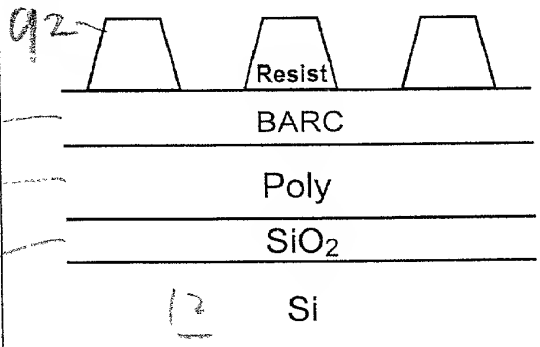


Figure 2. Ellipsometer or reflectometer with rotating polarizer and analyzer

~~Figure 3~~. Measured Structures (profile and film stack)

FIG. 3A

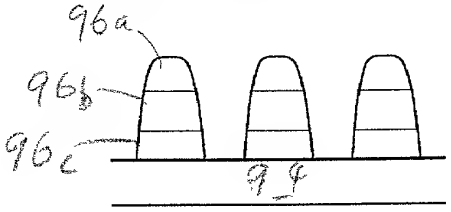
~~a.~~ Trapezoidal grating on top of a film stack



94 { 94a, 94b, 94c

FIG. 3B

~~b.~~ Etched grating



~~c.~~ Grating with sidewall spacers

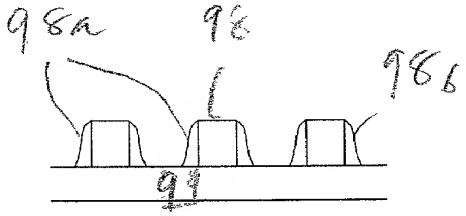


FIG. 3C

~~d.~~ Periodic structure with via holes

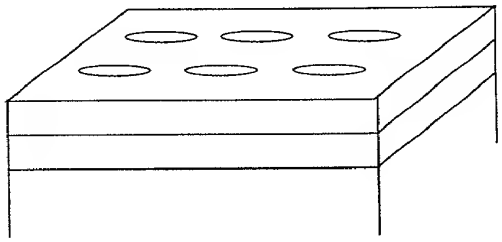


FIG. 3D

Figure 4. Sample Profile Models

Fig. 4A

a. Single material, multi-trapezoid profile

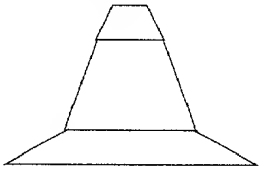
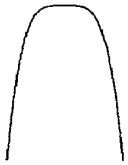


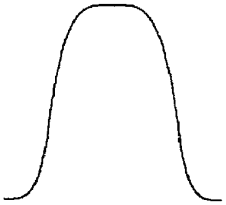
Fig. 4B

b. Single-material, quartic profile



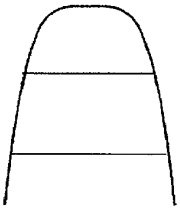
c. Single-material quartic profile with a bottom rounding

Fig. 4C



d. Multi-material etched profile based on the quartic model

Fig. 4D



e. Two-material profile with sidewall spacers

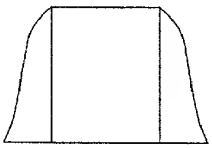


Fig. 4E

f. 3-dimensional via hole profile – a hole in a uniform layer

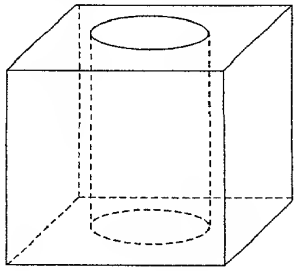


Fig. 4F

Figure 5. Flowchart of profile and film measurement

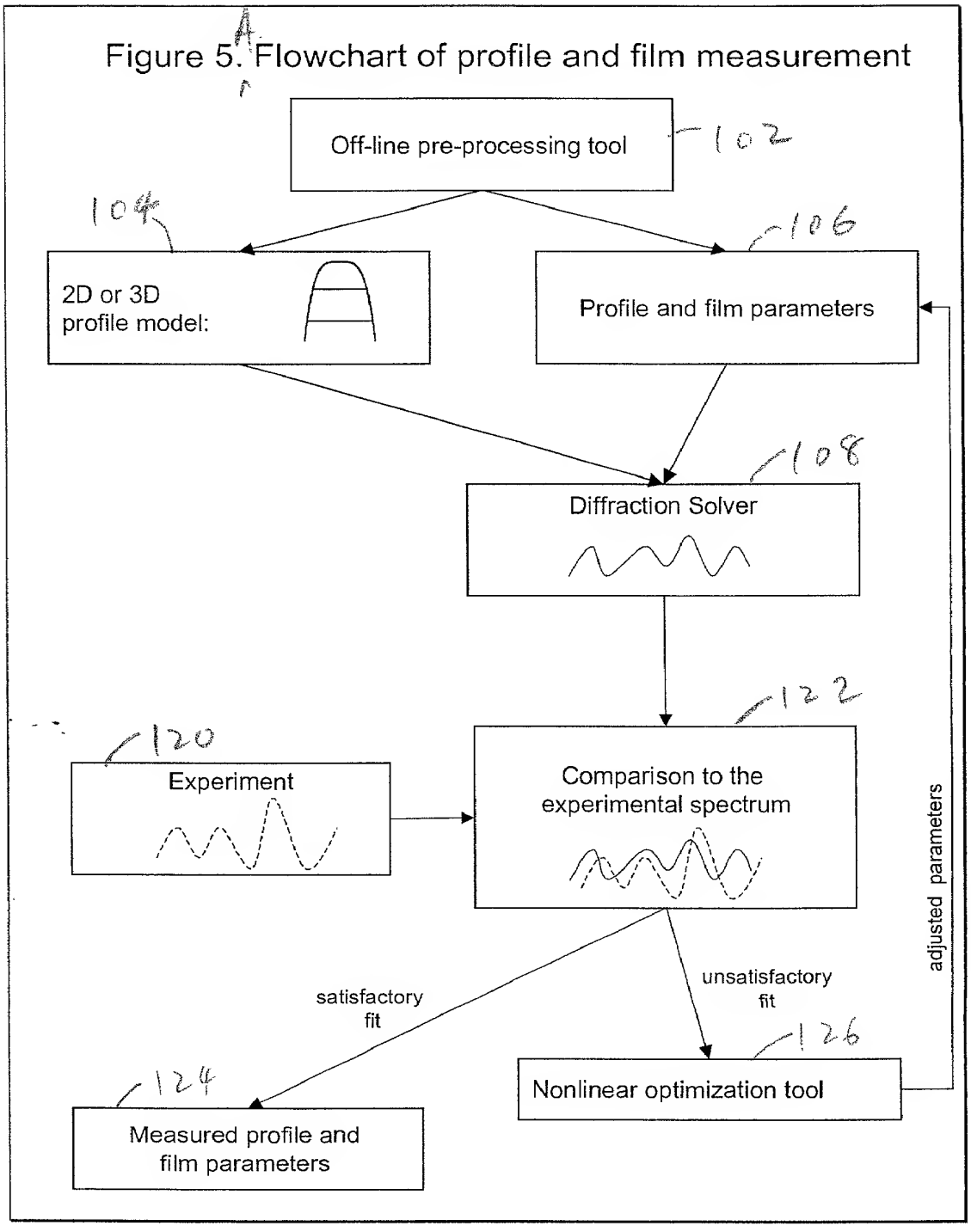


Figure 5a. Flowchart of Diffraction Solver

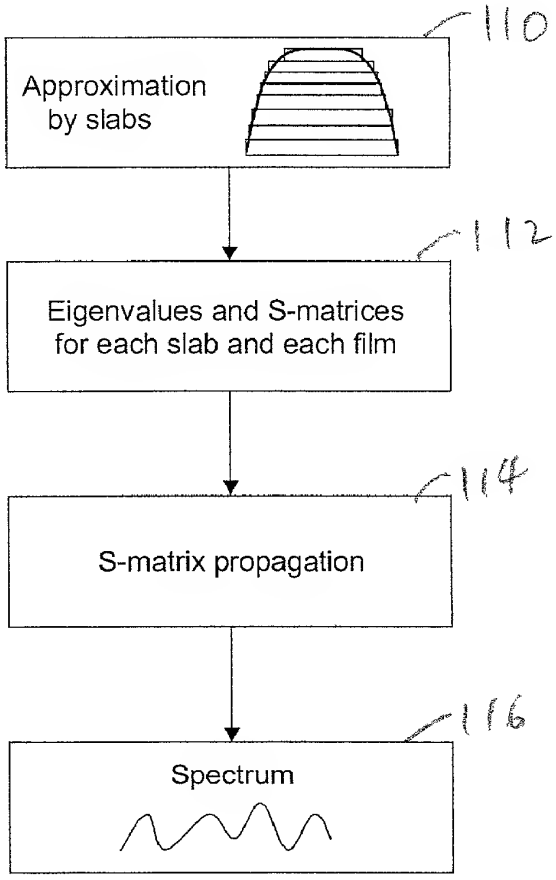
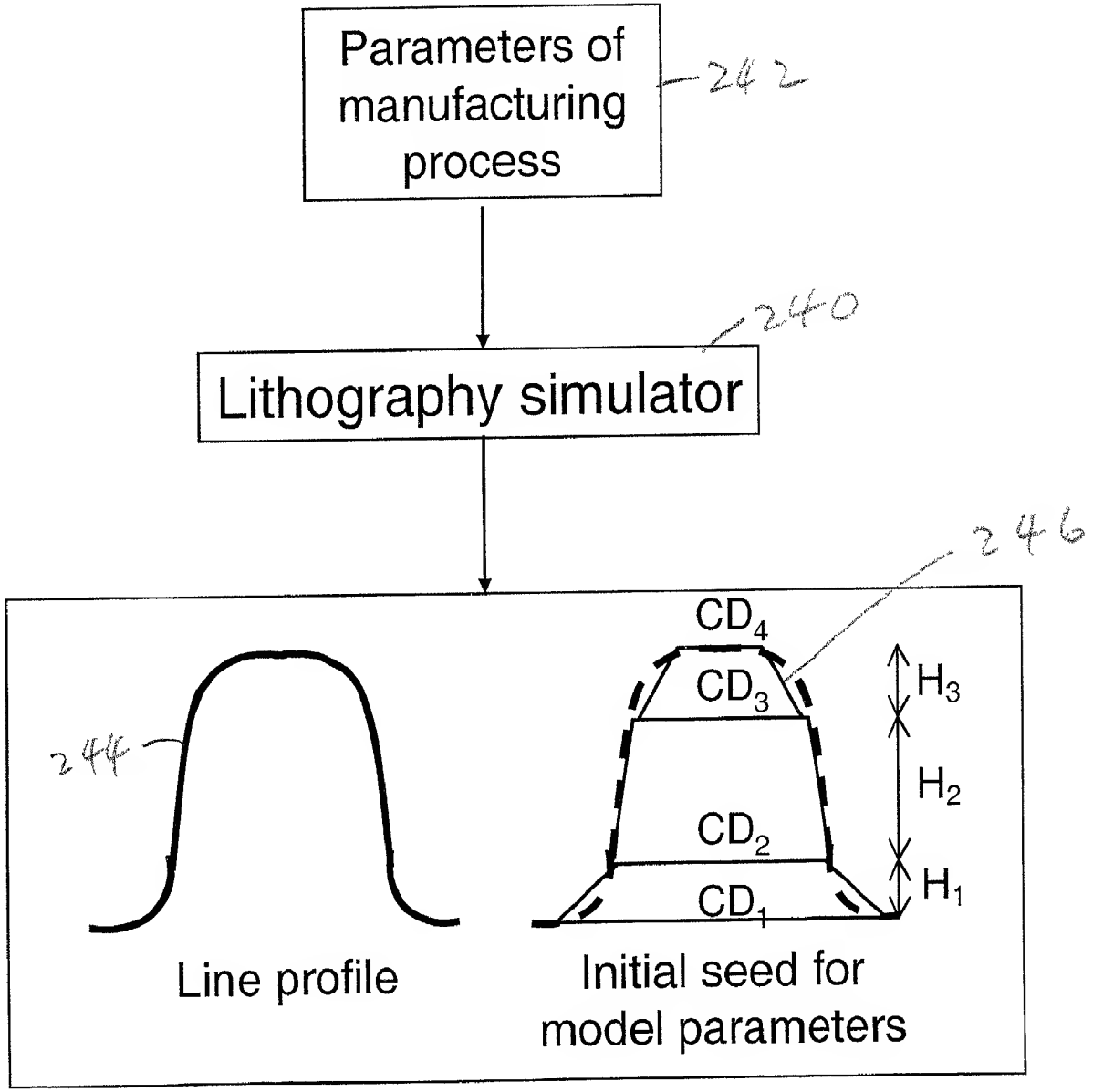
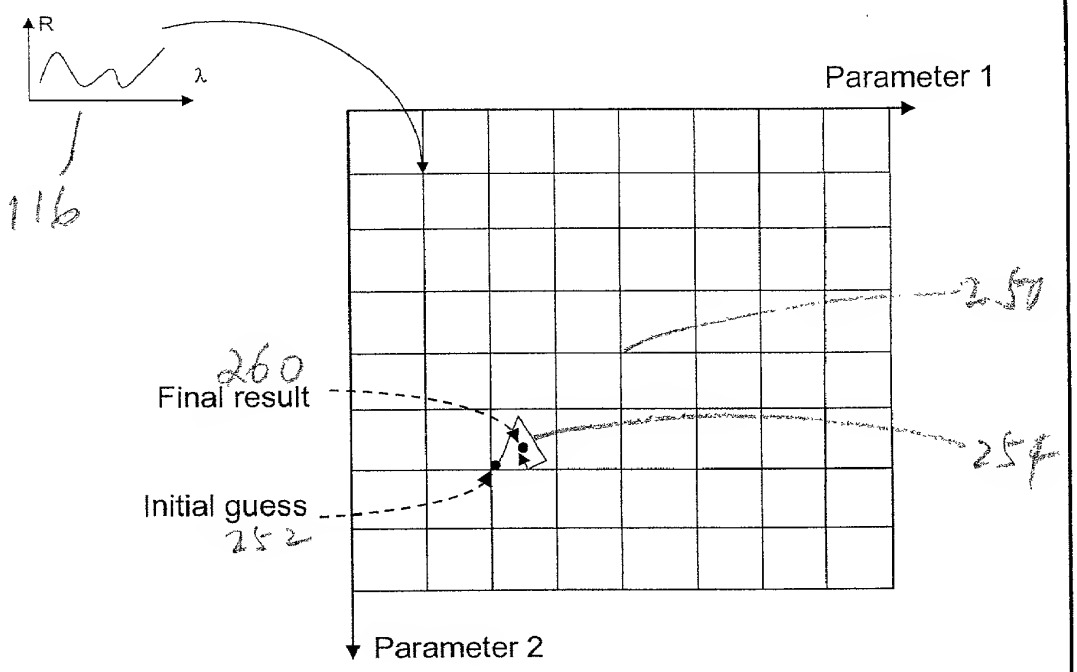


Figure 6a. Selection of the optimal profile model and initial seed



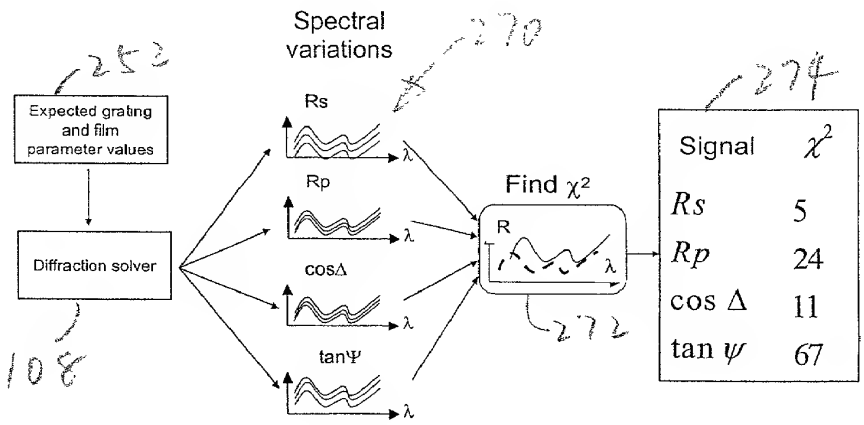
6B

Figure 6c. Selection of the starting point for nonlinear optimization from the coarse library



6C

Figure 6b. Selection of the optimal signal for matching



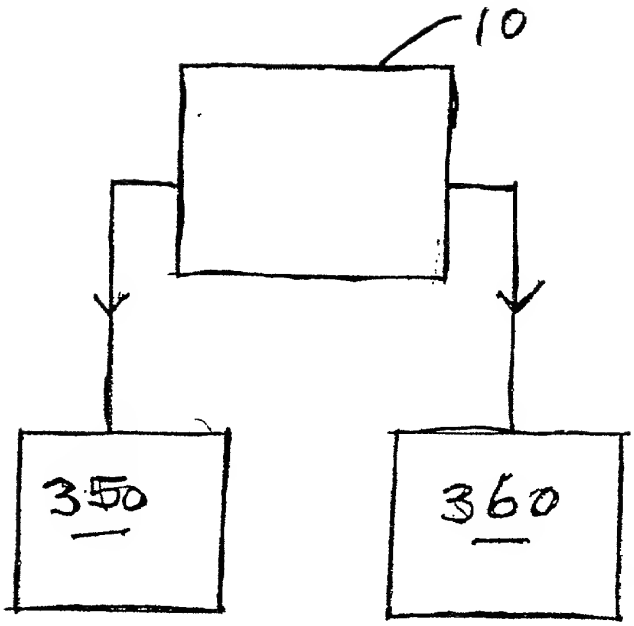
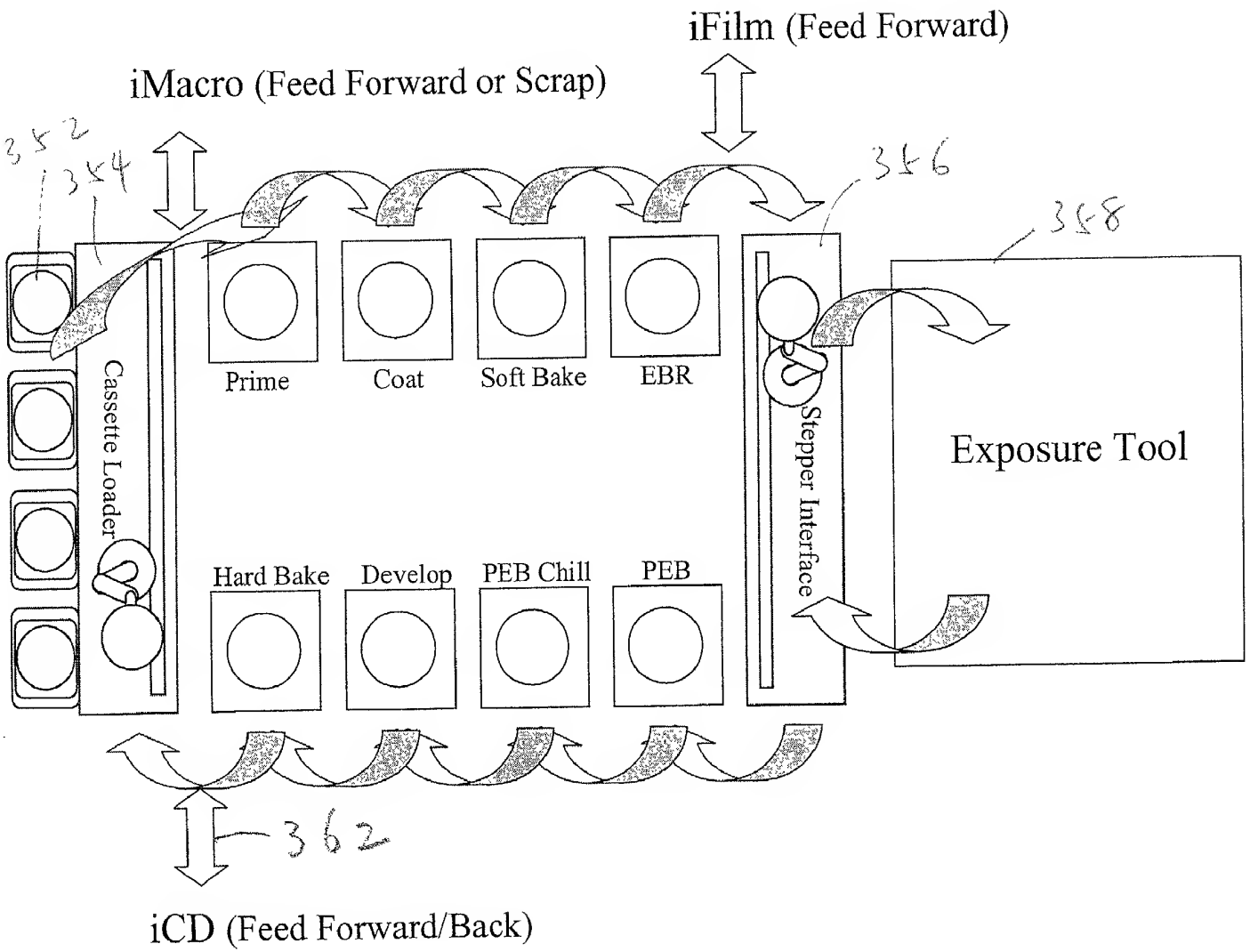


FIG. 12

FIG. 8

350

Points of Integration



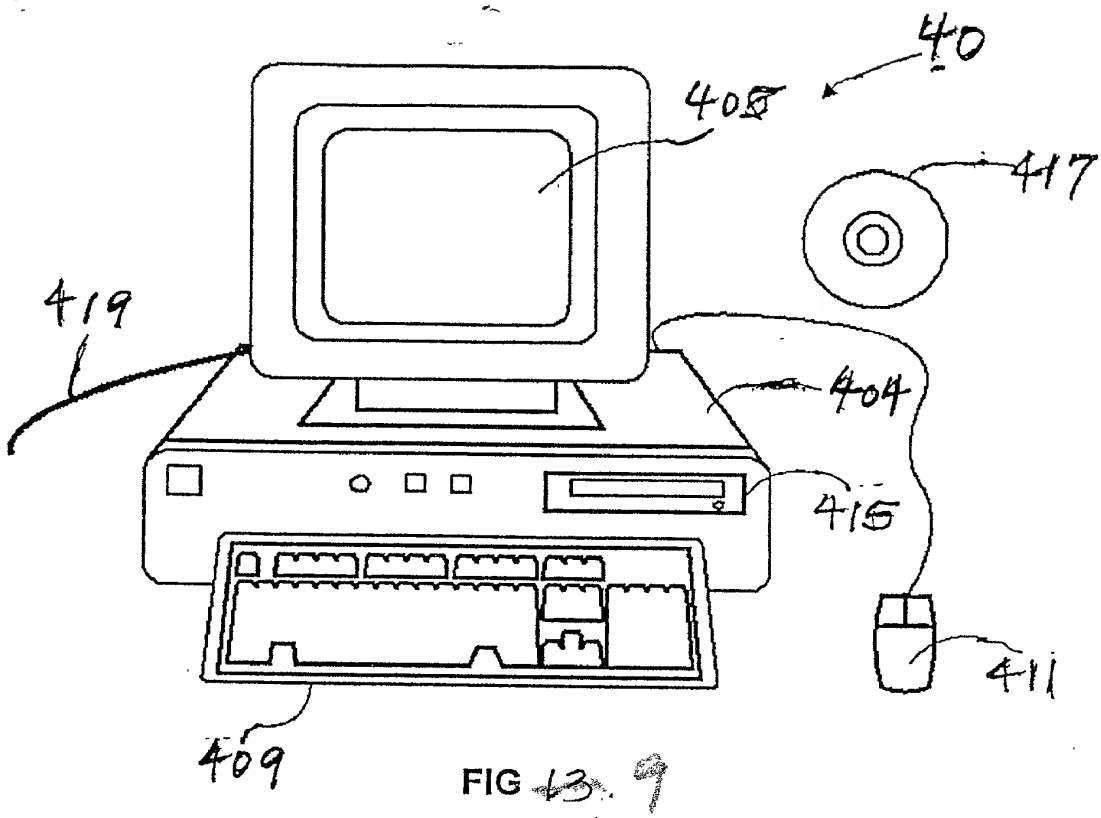


FIG 4. 9